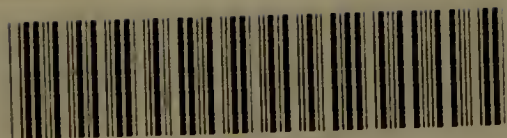


ANEMIA SPLENICA



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ANEMIA SPLENICA.

[SECOND PAPER.]

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THE question of the existence of a separate malady, anemia splenica is still in what may be called the tentative or inquisitive stage. The proposition which I offer for discussion is, that a special malady does exist, of unknown etiology, characterized by a chronic course, enlargement of the spleen, anemia of a secondary type, a marked tendency to hemorrhage from the stomach, and a liability in the late stages to be associated with jaundice, cirrhosis of the liver, and ascites. The conditions described as primitive splenomegaly and Banti's disease are initial and terminal stages, respectively, of this malady. The history of the question I need not discuss, as it is very fully given in the papers of Sippy¹ and of Wentworth.² Nor is it necessary to discuss the possible connection of the malady with Hodgkin's disease or pseudoleukemia, with which a majority of observers rightly consider it has nothing whatever to do. In January, 1900, I reported a series of cases.³ In the present paper I shall give (1) a few additional cases and the subsequent history of several of those previously reported; (2) an analysis of a series of cases of anemia with enlarged spleen, furnished by members of the Association, and (3) a summary of the clinical features of the disease.

I.

The subsequent history of some of the cases in my previous paper may first be given:

¹ American Journal of the Medical Sciences, November, 1899.

² Boston Medical and Surgical Journal, 1900.

³ American Journal of the Medical Sciences, 1900, vol. cxix.

CASE X.—A man, aged thirty-nine years, was first seen June 15, 1898, with moderate enlargement of the spleen, moderate corpuscular anemia, low hemoglobin, and marked pigmentation. He did not know for exactly how long he had had the anemia or the enlarged spleen. I heard from him March 27, 1902. He had been in fairly good health, except that in March, 1901, he had three hemorrhages from the stomach, which, he says, nearly killed him. He was unconscious and in a state of torpor for two weeks. Following this, he had ascites, and had to be tapped. At the date of writing he said he had recovered sufficiently to be able to do his work.

CASE XIV.—A man, aged thirty-five years; a very typical instance, with a greatly enlarged spleen, characteristic blood condition, slight pigmentation of the skin, attacks of hematuria, with slight jaundice. He was last seen on April 16, 1900. The spleen was enlarged; he had been jaundiced for two weeks; edge of liver could be felt 6 cm. from the ensiform cartilage; the right lobe only felt on deep inspiration. He has been under Dr. Thayer's care, who reports this spring that he is still anemic, but able to be at work.

CASE XIII.—Mrs. C. was of exceptional interest, as there was a doubt as to whether the case was not one of pernicious anemia, with greatly enlarged spleen. She did well in the hospital, the spleen reduced in size in a remarkable way. She left the hospital November 20, 1899. She remained well during 1900. The spleen was not below the costal border. She was readmitted in April, 1901, in a condition of the most profound and progressive anemia, in which she died on the 26th. The blood had all the features of a pernicious anemia. The spleen weighed only 400 grams, and the pulp was soft and flabby. There was fatty degeneration of the heart. The liver weighed 1500 grams. The bone-marrow was of a deep gray-red color. The blood condition on her first admission (see first paper), the remarkable improvement with rest and arsenic, the complete disappearance of the symptoms, and the enlargement of the spleen, the relapse, with profound and fatal anemia, leave no doubt, I think, that this belongs to a group of cases of pernicious anemia with enlarged spleen, and does not come in the category of chronic cases here considered.

CASE V.—Male, aged thirty-eight years; seen first November 10, 1898. For nearly twelve years he had had recurring hemorrhages. He returned to the hospital in January, 1900. Dr. Cushing removed the spleen. He did well for ten days, and then had a severe, uncontrollable hemorrhage from the stomach, which proved fatal. On postmortem there were found (1) a practically normal condition of the viscera; (2) moderate cirrhosis of the liver, and (3) esophageal varices, from one of which the last bleeding had occurred. The spleen showed a condition of chronic hyperplasia. In this extraordinary case the enlarged spleen had existed for fourteen years, and he had had throughout the period recurrent hemorrhages.

NEW CASES.

CASE XVI. *Clinical summary: Enlarged spleen and marked pallor for nine years; four severe attacks of hematemesis; removal of spleen; uncontrollable*

*hemorrhage; death.*¹—Frederick G., aged thirty years; referred to me by Dr. W. W. Johnston, January 14, 1901. The patient had lived in Washington all his life. When a boy at school he had chills and fever. He has had no attacks within ten years. For years he has been pale. He has, however, been able to attend to his work, and has been active and energetic. He is married. In 1892 it was first noticed that he had an enlargement in the abdomen. This was recognized by Dr. Johnston and others to be the spleen. It had caused him no inconvenience except for an occasional attack of pain in the side. He has had four severe attacks of hemorrhage from the stomach, the first in November, 1896, the second in November, 1897, the third in August, 1900, and the fourth on December 17, 1901, from which he is just recovering. Dark and bloody stools were often noticed after the attacks. They were of great severity. In the one in November, 1897, he had repeated hemorrhages, and very nearly died. He did not recover for nearly five months. Apart from the hemorrhages, his health, on the whole, has been good. The appetite and digestion had been normal and the bowels regular. He has never had a high color, but has had a curious gray pallor, with slight diffuse pigmentation, which has increased of late. His average weight has been 133 pounds. The spleen was enormous, almost filling the left half of the abdomen. The liver was not enlarged.

He was urged by Dr. W. W. Johnston to have the spleen removed, in which opinion I concurred, and he was admitted to the hospital for preparatory treatment. The blood showed red blood corpuscles, 3,300,000; white blood corpuscles, 2400; hemoglobin, 30 per cent.; moderate poikilocytosis; no nucleated reds. Between February 14th and April 14th he gained thirty pounds in weight! The blood improved, rising gradually until on April 5th the red blood corpuscles were 5,200,000 and the hemoglobin 75 per cent. On April 15th Dr. Halsted operated. After ligation of the splenic vessels great difficulty was met with in controlling the hemorrhage from the large veins passing to the stomach—*vasa brevia*—some of which were as large as the little finger. He lost so much blood that death took place a few hours after the operation. There was no autopsy. The liver, seen at the time of the operation, was smooth, and did not look cirrhotic.

CASE XVII. *Clinical summary: History of malarial fever eighteen years ago; tumor of left side of eleven years' duration; in 1898 an attack of severe anemia, with ascites; recovery; in 1900 a second attack, with jaundice, anemia, and ascites; gradual recovery; in 1901 a third attack, with jaundice, ascites, profound anemia; recovery.*—Minnie W., aged forty years, was first seen in 1898, when she was admitted to Ward O on August 3d (Med. No. 8864), with great swelling of the abdomen and anemia. She had been a healthy woman, married, three children—the youngest eighteen years old. She has always lived in Baltimore. In 1890 she had chills and fever through the summer, and they recurred for several years. She has noticed a hard mass in the left

¹ The surgical and pathological aspects of Cases IV., V., and XVI. will be considered in a separate paper by Drs. Cushing and Macallum.

side of the abdomen since 1890. On the first admission, August 3d, there was no jaundice. She had a greatly distended abdomen, edema of the ankles, and an extreme anemia. The red blood corpuscles were 2,500,000; hemoglobin, 47 per cent.; white blood corpuscles, 1500. There were no malarial parasites; no pigment in the blood. The dropsy subsided rapidly, and it was then found that the spleen reached 18 cm. from the costal margin. A differential count of 525 leukocytes gave small mononuclears 21, large mononuclears 5, polymorphonuclears 67, eosinophiles 2.6, transitionals 1.9. Two nucleated reds were seen. With iron, good food, and open-air treatment (eight to ten hours daily) she improved rapidly, and on September 30th she left the hospital with the condition of the spleen unchanged, but with the red blood corpuscles at 3,500,000; white blood corpuscles, 2400; hemoglobin, 53 per cent. The edge of the liver could be felt 3.5 cm. below the costal border, "soft and slightly tender."

Second admission August 10, 1900, with jaundice, anemia, and ascites. The jaundice had come on about three weeks previously. She has been pretty well for two years, and had been at work. The abdomen measured 92 cm. She was anemic. Red blood corpuscles, 3,800,000; white blood corpuscles, 2000; hemoglobin, 65 per cent. The ascites quickly disappeared and the jaundice lessened. She had two transient attacks of fever. There were no parasites in the blood, and no pigment. She left the hospital November 10, with red blood corpuscles at 4,600,000; white blood corpuscles, 7000; hemoglobin, 70 per cent. The liver reached 3 cm. below the costal margin in the nipple line, and was very tender.

Third admission September 30, 1901, with jaundice, moderate ascites, and anemia. She had kept pretty well since last note. Two weeks before admission she had nausea and vomiting and a chill. With the exception of the deeper jaundice her condition was a good deal better than at the last admission. The abdomen was large and contained a good deal of fluid. The spleen reached 5 cm. below the navel, and the edge was 18 cm. from the costal border. Red blood corpuscles, 3,800,000; white blood corpuscles, 4200; hemoglobin, 58 per cent. As the fluid reduced the liver could be felt just below the costal border in the nipple line, and I noted on October 4th the "edge can be distinctly felt; it is very hard and feels cirrhotic." The jaundice was marked, and there were dilated venules on the face. She again improved, and on October 26th the red blood corpuscles were 4,700,000; white blood corpuscles, 3000; hemoglobin, 62 per cent. The spleen was unchanged. On October 5th a differential count of 500 leukocytes gave, polymorphonuclears 80.6, small mononuclears 9, large mononuclears 5.8, transitionals 3.4, eosinophiles 1.2.

CASE XVIII. *Clinical summary: Enlarged spleen first noticed fifteen years ago; attacks of abdominal pains; marked pigmentation; slight enlargement of the liver; jaundice and secondary anemia; slight fever; marked improvement.*—A. L. W., aged thirty-three years; admitted December 27, 1901 (Med. No. 13,848), with jaundice and slight fever. Inflammatory rheumatism fifteen years ago; ulcers on the right leg afterward. Sixteen or seventeen years ago

had chills and fever. He went to Mexico, and while there was jaundiced and sickly for eight or nine months. He returned from Mexico fifteen years ago, and the doctors told him he had an enlarged spleen, which has persisted ever since. He has had gonorrhea, but has not had syphilis. He has been a moderate drinker. He does not think the spleen has increased much in size since it was first noticed. He has been pale for years; he has had occasional attacks of pain, and often a sense of discomfort after eating. For some time he has been losing in weight and feeling badly. His normal weight is 145 pounds; on admission it was 127 pounds. He has lately had cough, with fever and sweats.

On admission Dr. McCrae made the following note:

"His color is striking; he is exceedingly sallow. There are numerous areas of pigmentation over the face and forehead; there is definite jaundice. The patient is sweating profusely; tongue slightly coated; gums and mucous membranes rather pale.

"*Thorax.* Well formed, rather rounded. Expansion good; seems equal. Percussion note clear throughout; everywhere hyperresonant. Breath sounds seem clear throughout.

"*Heart.* There is rather a diffuse impulse. Point of maximum impulse, fifth left interspace, 155 cm. from mid-sternal line. Cardiac dulness begins at third right, opposite fourth interspace; extends 3 cm. to right and 11 cm. to left of mid-sternal line. Impulse well felt; no thrill. At apex the first sound completely replaced by soft murmur, carried to axilla. In fourth interspace there is a suggestion of a sound. On passing upward the systolic bruit increases in intensity, reaching a maximum in aortic and pulmonary areas. It can be heard on both sides out to about the nipple line; is loudly heard over the vessels of the neck. In the third left interspace close to the sternum the systolic murmur has a very rough quality. The second sound everywhere is soft. No definite diastolic murmur is made out. In aortic area has a murmurish quality. Pulse 24 to quarter, of fair tension, regular, of suggestive collapsing quality; there is a quick rise. Pulse is not that of aortic stenosis.

"*Abdomen.* Slightly full; no special visible prominence; no rose spots; walls fairly soft. Spleen very readily palpable; extends 12 cm. from the left costal margin, and comes to within 4 cm. of the navel and 5 cm. of the left anterior superior spine. It is hard, slightly tender, and slightly movable. Liver apparently also enlarged; in median line the edge being 5 cm. above the navel, and in the right nipple line 4 cm. below the costal margin. In the right nipple line dulness begins at the fifth right and extends 12 cm.; in the mid-axillary line dulness begins at the fifth interspace. The patient's body not specially pigmented, though dark; no special pigmentation about the nipples.

"Hemoglobin, 53 per cent.; red blood corpuscles, 3,026,000; white blood corpuscles, 6875. Differential count; Jenner stain. Red cells show marked poverty in hemoglobin, marked variation in size, there being many microcytes, no macrocytes, some poikilocytosis. In counting 536 cells no nucle-

ated reds seen. Count in general shows relative increase in mononuclear elements; polymorphonuclears, 55.96; large mononuclears, 29.85; small mononuclears, 11.19; transitionals, 2.23; eosinophiles, 0.37; mastzellen, 0.37."

For five days his temperature ranged between 100° and 101°, and he had a soft friction murmur in the left axilla. He had a small quantity of sputum, which was repeatedly examined for tubercle bacilli, with negative results. He gradually improved, the jaundice lessened, but there seemed to be an increase in the general pigmentation of the skin. By February 1st the patient was very much better. On the 2d, red blood corpuscles, 3,600,000; hemoglobin, 65 per cent.

He was discharged February 7th, still looking rather pigmented, but free from fever, and having gained six pounds in weight. The urine contained bile at first, but was otherwise normal. The spleen was unchanged.

II. INCIDENCE OF ENLARGED SPLEEN WITH ANEMIA.

While the combination seems to be not infrequent, yet cases reported in the literature as splenic anemia are rare. Rolleston, in his recent paper,¹ states that he has been able to collect only thirty-seven cases. In February last I sent a circular letter to members of the Association asking for information on the subject, and for notes of unpublished cases. I am indebted to twenty-four physicians for notes of forty-five cases, which I have grouped as best I could. It was not always possible to classify the cases properly, as in some no information was given as to the duration of the disease.

1. *Acute Anemia, under One Year's Duration, with Enlarged Spleen*, 12 cases.²

In none of the cases was there a history of malaria, the duration of the illness ranged from eleven weeks to twelve months. The size of the spleen was not always stated. In the cases of A. O. J. Kelly and J. C. Wilson it was only two fingers' breadth below the costal border; but in the cases of Cary, Edwards, Blackader, and Rotch the organ was greatly enlarged. In eight of the cases the red blood corpuscles were below $2\frac{1}{2}$ millions per cubic millimeter. In the cases of Musser and Blackader the count sank below one million per cubic millimeter. The hemoglobin was relatively low in six cases, of normal proportion in two, plus in two, and not given in two cases.

The leucocytes were under 6000 per centimeters in eight cases; in three of these, below 2500. In two they were about normal, and in

¹ Clinical Journal, 1902.

² Abstracts will be found in the appendix.

only two above normal, in one 7000 per cubic millimeter, and in one 20,000 per cubic millimeter.

In some of these cases the history, course, and blood condition suggest progressive pernicious anemia. Case XIII., reported in my first paper, had, as I then remarked, many of the features of this disease. She returned (as noted in the early part of this article), and died with all the features of a pernicious anemia, plus great enlargement of the spleen. This group is of unusual interest, and brings up the question of the frequency of enlarged spleen in pernicious anemia. Hunter¹ says "in a certain number of instances the spleen has been found enlarged, this condition being even recognizable during life." He mentions a number of cases reported by different observers; the largest mentioned "was in a case reported by Wilks (500 grams). In four cases of his own, the spleen weights were 19 ounces, 11 ounces, 10 ounces, and 13 ounces." In a great majority of the cases the spleen is either described as normal or no mention is made of the condition at all. Cabot² notes enlargement in 13 of 110 cases; Billings³ in 5 of 20 cases. Among 40 cases from my wards, reported by McCrae⁴ "the spleen was felt in only 6 cases, and in none of them was the enlargement at all marked, it being noted that 'the spleen was just felt.'"

2. *Chronic Anemia, with Enlarged Spleen*, 26 cases.

Eighteen of these were in males. The duration of the disease is most interesting; eleven years, 1 case; nine, 1; eight, 1; seven, 3; six, 2; five, 1; three, 2; four, 1; two, 3; between one and two years, 3; in 1 doubtful, "many years." In 9 of the cases the disease had lasted for more than five years; in 7 the duration was unknown. Hematemesis occurred in 9 cases, jaundice in 4 cases, ascites in 5, and in 7 cases the liver was enlarged. Several of the cases had been regarded as Banti's disease, or the terminal stage of anemia splenica.

In only 7 of the cases were the red blood corpuscles below 2,500,-000 per cubic millimeter. In 22 cases the hemoglobin percentage was relatively low, in 3 it was normal, and in 1 it was not given. In 13 cases the leukocytes were below 5000 per cubic millimeter. In a

¹ Pernicious Anemia (monograph), 1901.

² American Journal of the Medical Sciences, 1900, p. 1.

³ Journal of the American Medical Association, 1902, i.

⁴ Ibid.

case of Vickery's they were only 650 to 700 per cubic millimeter, and in Peabody's case they were only 800 per cubic millimeter, and the highest of several counts in this case was 1400. In 3 cases they were above 7000 per cubic millimeter, and in 9 cases they ranged from 5000 to 7000 per cubic millimeter.

3. *Simple Splenomegaly*, 2 cases.

Two cases were returned as simple or primitive splenomegaly. In Dr. Herrick's case the normal red count and the relatively low hemoglobin, with a history of ill-defined symptoms for five years, suggest the early period of splenic anemia. In Drs. Blackader and Martin's case the enlarged spleen was found after an accident in which the man was knocked breathless. He vomited dark material. The spleen has gradually increased in size. There is practically no anemia.

There were three cases difficult to classify, and in two cases other diseases were presented—cirrhosis of the liver and sarcoma of the spleen. (See Appendix.)

III. ANEMIA SPLENICA CHRONICA.

DEFINITION. *A chronic affection, probably an intoxication of unknown origin, characterized by a progressive enlargement of the spleen which cannot be correlated with any known cause, as malaria, leukemia, syphilis, cirrhosis of the liver, etc. (primary splenomegaly); anemia of a secondary or chlorotic type (leukopenia), a marked tendency to hemorrhage, particularly from the stomach; and in many cases a terminal stage, with cirrhosis of the liver, jaundice, and ascites (Banti's disease).* It seems probable that the conditions separately described in the literature as primitive splenomegaly, splenic anemia, splenomegalic cirrhosis of the liver, or Banti's disease are stages of one and the same malady. Let me first give a brief analysis of the cases which have been under my care which conform to the above definition. I have cut out Cases I. and II. of my first series, as they were seen long ago (1879), though both patients had enlarged spleen and hematemesis; but I am uncertain about the duration and etiology. Case XIII. I have also discarded as probably progressive pernicious anemia with greatly enlarged spleen. This leaves a group of fifteen cases, seen within the past ten years; all have been carefully studied, and the full report of the blood condition will be found

in the *Edinburgh Medical Journal*, May, 1899, and in the *American Journal of the Medical Sciences*, January, 1900, and in the present paper.

ABSTRACT OF FIFTEEN CASES.

CASE III.—Male, aged thirty-five years; duration twelve years. Enormous spleen; recurring attacks of hematemesis and melena; pigmentation of the skin; death after an attack; no cirrhosis of the liver. Blood count lost.

CASE IV.—Male, aged thirty-three years; duration ten years. Recurring attacks of hematemesis and melena; enormous spleen; pigmentation of the skin; removal of the spleen; liver not cirrhotic; recovery. Red blood corpuscles, 3,000,000; hemoglobin, 25 per cent.; leukocytes, 2800.

CASE V.—Male, aged forty years; duration thirteen years. Recurring attacks of hematemesis; occasional melena; enormous spleen; grayish-brown pigmentation of the skin; slight ascites; removal of the spleen; liver moderately cirrhotic; death from rupture of esophageal varix. Red blood corpuscles, 4,000,000; hemoglobin, 30 per cent.; leukocytes, 6500.

CASE VI.—Male, aged twenty years; duration eleven years. Onset with hematemesis; pigmentation of the skin; spleen very large. Red blood corpuscles, 2,187,000; leukocytes, 12,497.

CASE VII.—Male, aged forty years; duration two years. Enormous spleen; recurring cutaneous hemorrhages; remarkable pigmentation of the skin. Red blood corpuscles, 4,816,000; hemoglobin, 55 per cent.; leukocytes, 5000.

CASE VIII.—Female, aged fifty-six years; duration three years. Spleen very large; no hemorrhages; no pigmentation. Red blood corpuscles, 3,600,000; hemoglobin, 60 per cent.; leukocytes, 3000.

CASE IX.—Male, aged fifty-eight years; duration six years. Spleen very large; recurring ascites; no hemorrhage; no pigmentation; enormous ascites; no cirrhosis of liver; death. Red blood corpuscles, 4,788,000; hemoglobin, 60 per cent.; leukocytes, 5200.

CASE X.—Male, aged thirty-nine years; duration doubtful—more than three years; hematemesis, melanoderma, and leukoderma; spleen greatly enlarged. Red blood corpuscles, 4,128,000; hemoglobin, 45 per cent.; leukocytes, 2800.

CASE XI.—Male, aged fifty-seven years; duration two years. Spleen greatly enlarged; no hemorrhages. Red blood corpuscles, 2,500,000; hemoglobin, 37 per cent.; leukocytes, 3000.

CASE XII.—Male, aged forty years; duration (now) four years. Greatly enlarged spleen; recurring hematemesis; ascites; recovery. Red blood corpuscles, 4,208,000; hemoglobin, 45 per cent.; leukocytes, 4000.

CASE XIV.—Male, aged thirty-five years; duration (now) four years. Hemorrhage from kidneys; no malaria; greatly enlarged spleen; marked pigmentation of the skin. Red blood corpuscles, 3,856,000; hemoglobin, 55 per cent.; leukocytes, 4500.

CASE XV.—Male, aged forty-three years; duration eight years. Very large spleen; recurring hematemesis. Red blood corpuscles, 4,270,000; hemoglobin, 45 per cent.; leukocytes, 2500.

CASE XVI.—Male, aged thirty years; duration ten years. Recurring hematemesis; grayish-brown pigmentation of the skin; removal of spleen; no cirrhosis of liver; death. Red blood corpuscles, 3,300,000; hemoglobin, 30 per cent.; leukocytes, 2400.

CASE XVII.—Female, aged forty years; duration ten years. Recurring attacks of acute anemia, with jaundice and ascites; enormous spleen; no hemorrhages. Red blood corpuscles, 3,500,000; hemoglobin, 53 per cent.; leukocytes, 2400.

CASE XVIII.—Male, aged thirty-three years. Duration of enlarged spleen fifteen years; organ greatly enlarged and liver enlarged; slight jaundice; marked pigmentation of the skin; no hemorrhages. Red blood corpuscles, 3,326,000; hemoglobin, 53 per cent.; leukocytes, 6875.

As in the cases collected by Rolleston, the *sex* in my series shows a great prevalence among males—thirteen to two. All of the cases were in adults, chiefly in young adults; in one only (Case VI.) had the disease begun in childhood.

There is nothing in the *etiology* of the cases to throw any light on the causation. The question of *malaria* naturally arises, considering the locality in which I practise. There was a history of malaria in five cases. In three of these (aged 40, 56, and 30 years) the infection was in childhood. In only two (Cases XVII. and XVIII.) had the infection occurred in adult life—one twelve years before onset of illness, the other eighteen years before. The locality has nothing to do with the number of cases observed; only five cases came from Maryland, four of which were from the city of Baltimore. The others came from New York, Pennsylvania, Illinois, Massachusetts, West Virginia, Virginia, North Carolina, South Carolina, Canada, and Jamaica.

Heredity has played no part in my cases, but Brill¹ has reported three cases in one family. One girl died, aged nine years, with enlargement of the spleen. The description of the other two cases leaves no doubt, I think, that they belong to the disease under discussion. Case III., with the peculiar pigmentation, the tendency to hemorrhages, and the type of anemia present, corresponds exactly with chronic splenic anemia. Bovaird² has described a similar condition in

¹ American Journal of the Medical Sciences, April, 1901.

² Ibid., October, 1900.

two sisters; a sister of Collier's¹ patient died with enlarged spleen, while C. Wilson² has reported a family in which in three generations six members had enlarged spleen. It is quite possible that all of these cases belong in the category of chronic splenic anemia.

SYMPTOMATOLOGY. 1. *The Remarkable Duration of the Disease.* Among disorders of the blood or blood-making organs anemia splenica is characterized by an extraordinary chronicity. In some of the cases in my series the disease had lasted more than twelve years. Rolleston reports a case of twelve years' duration, beginning in the eleventh year, the condition remaining throughout very much the same, except that during the last three years of life there was recurring hematemesis. Senator³ and others have noted this peculiarity. An extraordinary illustration I saw last winter in New York with Dr. Walter James, who will report the case in full. The patient had had an enlarged spleen, with anemia of varying intensity, for at least twenty-five years. He died at last in a profound anemia, with ascites. Gaucher's case of splenic enlargement existed for twenty-five years. In my series of fifteen cases, in seven the duration of the disease was more than ten years, and in eleven, more than four years.

In ten of the twenty-six cases of chronic splenic enlargement, with anemia, under the care of my colleagues in the Association, the disease had lasted more than five years. It is strange how slight may be the inconvenience, even with a spleen extending below the navel. A majority of my patients were active business men, and, as in Cases III. and XVI., the chief trouble was the recurring hematemesis and the protracted up-hill convalescence after the attacks.

2. *The Splenomegaly.* There are many conditions in which the spleen may be enlarged for months or years, sometimes without any apparent injury to health. I have had a group of cases of moderate enlargement of the spleen in women, without obvious cause and without marked anemia, in which the discomfort of the movable organ was the chief complaint. Two of these cases have remained well for years, having had the organ "packed" into position. Among the dark-skinned emigrants from southern and eastern Europe and from Armenia moderate enlargement of the spleen is not uncommon

¹ Pathological Society Transactions, vol. xlvj.

² Clinical Society Transactions, vol. xxiii.

³ Deutsches Archiv f. klin. Med., 1901.

—a point noted by Cabot in the discussion of this paper. It may be a manifestation of latent paludism.

In the very large group of cases of splenomegaly, with secondary anemia :

(a) The cause is usually apparent—malaria, tuberculosis, rickets, or syphilis—particularly in children, in whom any state of malnutrition, if protracted, may be associated with enlargement of the spleen.

(b) The anemia and splenomegaly usually yield to appropriate treatment; at all events there is not the remarkable chronicity.

(c) The spleen in this group rarely reaches the colossal size seen in chronic splenic anemia.

(d) The sequences so characteristic of splenic anemia are not seen.

(e) While the blood shows the features of a secondary anemia, there is rarely the exaggerated chlorotic type, and leukocytosis is more common than leukopenia.

There are many gaps in our knowledge, and it is difficult to assign to individual cases their proper places. It may not always be possible to speak definitely. For example, in the case of James P., aged four years, sent by Dr. Rotch (No. 12, acute cases), with a large spleen and a marked anemia, with leukopenia of two months' duration, where shall we classify it? or a case, sent by Cabot, of a child aged seven months, duration of illness not stated, with red blood corpuscles, 3,200,000; hemoglobin, 25 per cent.; leukocytes, 36,800, and nucleated red blood corpuscles 6190 per cubic millimeter. The anemia is more or less acute, the splenomegaly moderate, and the blood condition may be very variable. On the other hand, many of the cases in children conform to the definition above given of chronic splenic anemia. Another case of Rotch's (No. 18 in chronic series): at the age of three years the spleen and liver were large, the anemia was marked; nine years later the spleen was enormous, the liver still enlarged, the anemia pronounced, and the skin was pigmented.

The special feature of the enlarged spleen in chronic splenic anemia is the size, which is unequalled in any other disease except, perhaps, leukemia. The abdomen may be enormously distended, and the organ may not only occupy the left side, but may curve upon itself and pass across to the right iliac fossa and the right flank. The notches may be directed upward, as in one of Collier's cases which I saw with him at the Radcliffe Infirmary, Oxford, in which the

border of the spleen and the notches were between the navel and the ensiform cartilage. The average weight in twelve cases collected by Rolleston was sixty-one ounces. In Bovaird's case the organ weighed twelve and one-half pounds. The mechanical discomfort may be considerable, though as a rule there is very little pain unless perisplenitis be present, in which case a friction may be felt or heard. In Rolleston's case a *bruit de diable* was heard over the organ.

Many of the cases reported in the literature as primary or primitive splenomegaly come under the definition of the disease as given above. In the chronicity (eleven and fifteen years and thirteen years) and in the general features the cases of Brill and of Bovaird conform to chronic splenic anemia.

3. *Hematemesis* is a remarkable feature of the disease. Eight of my patients had attacks of vomiting of blood. In Casés I. and II. (which I have discarded from my series as seen in 1879 and deficient in certain details) the hemorrhages were most profuse. I have never seen such enormous losses of blood as in Case II. In the nineteen cases communicated by members of the Association, hematemesis occurred in seven. In a large proportion of the cases the hemorrhage is due to conditions associated with the enlarged spleen, not to accompanying cirrhosis of the liver. In Cases IV. and XVI. of my series the spleen was removed, and at the operation the liver was seen to be normal. In Case III. it was not cirrhotic postmortem. It is easy to understand this splenic origin, as 40 per cent. of the blood from the stomach passes by the vasa brevia to the splenic veins. (Mall and Krauss.) Watson gave a mechanical explanation (which I have quoted in my first paper) of the bleeding. The source of the blood may be (a) a general diapedesis from the gastric mucosa. This is doubted by some writers, but on several occasions I have not been able to find, after a most careful search, either minute erosions of the mucosa or ruptured veins in the esophagus, and there seems to be no other explanation; (b) small erosions of the gastric mucosa; (c) rupture of a varicose vein of the esophageal plexus, which was the cause of death in Case V. after removal of the spleen. The recurring profuse bleedings may very often be from this source, considering the intimate relation between the veins of the fundus of the stomach supplying the vasa brevia and those of the cardiac orifice and the esophagus; (d) Rolleston suggests that the large wandering spleen

may pull on the gastrosplenic omentum and give rise to torsion of the veins, or cause a kink in the splenic vein, and so induce intense venous engorgement of the stomach.

With the exception of the chronic hemorrhagic form of the peptic ulcer there is no known condition in which hematemesis may occur for so many years. In Preble's¹ study of gastrointestinal hemorrhages in cirrhosis of the liver, in five of the thirty-five cases in which esophageal varices were found the hemorrhages had occurred at intervals varying from a few months to five years.

Hemorrhage from other sources is less frequent. Epistaxis may recur at intervals; retinal hemorrhages, bleeding gums, menorrhagia, and hematuria have been recorded. Purpuric attacks, as in Case VII. of my series, may occur.

4. *Anemia*. Even in well-defined cases the anemia may be slight. As in locomotor ataxia there may be no ataxia, so in anemia splenica there may be no corpuscular anemia—a point which may be urged against the use of these names. Take, for example, Case XVI., here reported. Prior to the operation there was no anemia of corpuscles, which were 5,200,000 per cubic millimeter, but he was still pallid and had only 75 per cent. of hemoglobin, and there was not the slightest change in the spleen; yet he presented a most typical picture, and anyone who had seen Cases III., IV., and V. could have recognized at a glance that the case belonged, with them, to a separate clinical group, quite as definite as leukemia or Addison's disease. Very few of the patients will be found to have a normal amount of hemoglobin; they are constantly "off color."

There is nothing peculiar or distinctive in the anemia, which is of the secondary or chlorotic type.

(a) *The corpuscular anemia* is of a moderate grade. Of the fifteen cases of my series the average was 3,425,000 per cubic millimeter. The lowest blood count was 2,187,000; the highest count was 5,200,000, in the patient just referred to.

(b) *The low hemoglobin* is an interesting feature and rather more striking than in other secondary anemias. It is certainly rare, except in chlorosis, to find a patient with obvious anemia and a blood count (corpuscles) normal or even, as in Case XVI., above normal. The average of thirteen hemoglobin counts was 47 per cent.

¹ American Journal of the Medical Sciences, January, 1901.

(c) *Leukocytes*. Immediately after a profuse hemorrhage, or in a terminal affair, there may be a leukocytosis, but, as a rule, there is a leukopenia. Of 14 cases the average leukocyte count was 4520 per cubic millimeter. If we leave out Case VI., admitted shortly after a severe bleeding, with a leukocytosis of 12,500, the average of 13 cases—in one of the series (III.) the blood count was mislaid—was 3850 per cubic millimeter.

In the extreme anemia which may come on at the close there may be marked poikilocytosis, with nucleated red corpuscles, etc. There has been nothing characteristic in the differential count of the leukocytes.

5. *Pigmentation of the skin* is a common event in the very chronic forms, having been present in eight of my cases. A majority of these presented the usual bronzing of the skin, diffuse in character, and resembling that seen in Addison's disease, though rarely so intense. In some it was a curious steel-gray staining of the skin, of a very peculiar character, suggesting rather argyria than the usual form of melanoderma. In some cases it was patchy and associated with areas of leukoderma.

Pigmentation of the skin seems to be a common feature in the long-standing cases, and has been commented upon by Brill, Bovaird, Frederick Taylor, and others. It is of special interest in connection with the melanoderma of hemochromatosis (bronzed diabetes) and of Hanot's cirrhosis. In Case XIV. of the series a portion of the skin did not show the ochre-brown pigment such as is present in hemochromatosis. It is to be borne in mind that arsenic is used largely in these cases, and it is quite possible that to it in part may have been due the dark color of the skin. In no case were there keratoses.

6. *Hepatic Features*. The mutual relations of diseases of the spleen and liver are well illustrated in splenic anemia. While a majority of the cases present no symptoms of disturbed action of the liver, and in a few the occurrence of ascites, even when the liver is normal, suggests cirrhosis, there is a third group in which the hepatic features so predominate that cirrhosis of the liver is at once suspected. Hematemesis is a splenic, not an hepatic, feature of the disease. Cases IV. and XVI., in which the hemorrhages had occurred for many years, presented at the time of operation a normal liver: Case IV. was alive and well (having had no recurrence of the hemorrhage) nearly three years subsequently. While hemorrhage from the stomach may be a

very early, indeed the very first, symptom of cirrhosis of the liver, it is most unusual to have recurrences over long periods, as in the cases recorded in this series. Even in the more chronic type of cirrhosis—Hanot's variety—hematemesis is not so special a feature as in splenic anemia. In the later stages of the disease the cirrhosis of the liver, if present, as in Case V., may aggravate the conditions favoring hemorrhage. In my series hepatic features have not been very marked.

Ascites occurred in four cases. In Case V. it was slight and associated with edema of the ankles. The patient had had shortly before readmission a series of bleedings. At the operation, and ten days subsequently at autopsy, slight cirrhosis of the liver was found. In Case XVII. ascites was present at the time of the admissions, August 3, 1898, August 10, 1900, and September, 1901. In each instance it disappeared with the general improvement. In the second and third admissions there was jaundice. The liver was slightly enlarged and felt cirrhotic. In Case XII. there was no dropsy when I saw him, but six weeks before six quarts were drawn off. Dr. Vickery writes that he had been tapped again. The liver was not enlarged. In Case IX. there was ascites in 1895, again in 1897, and a third time in his final illness, in the spring of 1898. The liver could be felt a little below the costal border, but at the postmortem there was no cirrhosis.

In the series of cases of anemia, with enlargement of the spleen, sent by my colleagues, ascites was present in the cases of McPhedran, Edes, Atkinson, Sears, and Cabot; in two of the cases in association with jaundice.

Jaundice was present in only two cases in my series and in four in the association series.

State of the Liver. In eight cases the liver was of normal size. In Cases IV. and XVI. the organ was seen to be smooth and natural looking at the time of operation. In Cases III. and IX. it was normal postmortem. In six cases it was slightly enlarged; in no case was the organ large and hard, as in forms of hypertrophic cirrhosis. In one case it was reduced in size; in only one (Case V.) was cirrhosis of moderate grade found postmortem. In seven of the cases in the association series the liver was enlarged.

RELATION OF THE CIRRHOSIS OF THE LIVER TO THE ENLARGED SPLEEN. Splenomegaly and cirrhosis of the liver are associated in the following conditions:

1. *Atrophic Cirrhosis of the Liver.* So constant is moderate enlargement of the spleen that in doubtful cases it is an important help in diagnosis. The organ is not often very large, rarely reaching to the navel. That it is due to the chronic passive congestion is shown by the remarkable reduction in size which may follow an attack of hematemesis. There is a moderate hyperplasia and often a perisplenitis. Parkes Weber suggests that the enlarged spleen may be due in part to a toxemia.

2. *Syphilis of the Liver.* Both liver and spleen may be involved in amyloid degeneration, but the cases in question are gummata of the liver with consecutive contraction. The spleen may reach a very large size. A remarkable congenital case, in a girl twenty-one years of age, occurred some years ago in my wards,¹ in which, in addition to the big spleen and syphilitic liver, there was a high degree of leukocytosis. In my previous paper on splenic anemia I have reported two other cases, and have called attention to the liability of error. In one of the histories sent by Dr. Musser the patient, aged forty-five years, had had syphilis of the brain. In 1898 and 1899 he had jaundice, with great enlargement of the spleen and liver, hemorrhages from the stomach and bowels, and moderate anemia. In Coupland's case² an enlarged spleen was removed, and two years later the patient died with hematemesis and ascites; the liver was found to be syphilitic. When we recognize more fully the great frequency of syphilis of the liver³ and learn the extraordinary diversity of its clinical features we shall find, I think, a very interesting group of cases characterized by irregularly contracted liver, big spleen, and anemia.

In both the alcoholic and syphilitic cirrhosis the liver, as a rule, is small, and *the splenomegaly follows and depends, in great part at least, on the condition of the liver.*

3. *Hemochromatosis.* This remarkable and most obscure affection is characterized by a chronic course, a gradual deposition of an iron-containing pigment in the organs and in the skin (leading to pigmentation), a progressive enlargement of the spleen, hypertrophic cirrhosis of the liver, sclerosis of the pancreas, and, finally, diabetes—the

¹ Johns Hopkins Hospital Bulletin, vol. ii.

² British Medical Journal, 1896, vol. i.

³ See recent papers by Elnhorn, Medical Record, 1901, and Stockton, Journal of the American Medical Association, 1902, vol. ii.

bronzed diabetes of the French. Anschütz¹ and Opie² regard the affection as a chronic toxemia leading to hemolysis, with gradual deposition of blood pigment in the organs (leading to sclerosis) and in the skin. There may be a marked tendency to hemorrhage (purpura). In the cases I have seen the spleen has not been enormously large,³ and the condition is one in which *the splenomegaly and the cirrhosis of the liver go hand-in-hand*, both apparently due to the same cause.

Anemia, so far as I can learn, has not been a special feature of the cases. It is of interest to note that in the case which was reported by H. A. Hare as Banti's disease, and which had been under the care of Musser and J. C. Wilson (Case I., *Chronic Cases*, in Appendix) the patient, who had been ill for seven years, had a very large spleen, moderately enlarged liver, anemia, and diabetes. No mention is made of pigmentation of the skin.

4. *Other Forms of Cirrhosis.* Apart from the alcoholic and syphilitic varieties, there is a large group of cases in which the disease occurs chiefly in the young, usually the hypertrophic form, and in association with great enlargement of the spleen.

(a) *Hanot's cirrhosis*, the best known of these varieties, is a very chronic enlargement of the liver occurring in young persons, sometimes as a family form, not associated with the abuse of alcohol or with malarial or syphilitic infection. The spleen is enlarged, but not of very great size in proportion to the liver. There is a chronic jaundice of varying intensity, a marked tendency to hemorrhage, but not specially to hematemesis, and very often a terminal *icterus gravis*. Rarer features are bronzing of the skin, a marked leucocytosis, and fever. Ascites does not occur (?). The relation in time of the hepatic enlargement, and the predominance of the biliary symptoms from the outset are characteristic features. The lesions are those of a biliary cirrhosis.

(b) There is a *simple cirrhosis* of the liver in children, without great enlargement of the liver, moderate splenomegaly, and a clinical picture almost identical with that of the disease in adults. Ascites is a prominent feature. Some of the cases have been of alcoholic origin, but in a majority I think the starting point has been in the changes which have followed one of the fevers of childhood. The

¹ Deutsches Archiv für klin. Med., 1899, Band lxii.

² Opie, Journal of Experimental Medicine, vol. v.

³ British Medical Journal, 1899, vol. ii.

condition is certainly very different from Hanot's cirrhosis, and very different, too, from the third type, (c) *splenomegalic cirrhosis*, the form which specially concerns us here on account of its relations with splenic anemia, and which must be discussed as a separate section.

5. *Splenomegalic Cirrhosis of the Liver*. After lasting for some time, splenic anemia may be followed by cirrhosis of the liver. It was the merit of Banti to call attention to this sequence. The splenomegaly may exist for a long period of years without leading to cirrhosis of the liver, as illustrated in Cases III. and IV. of my series. In Case V., after a period of between thirteen and fourteen years, the organ was only moderately cirrhotic. The enlargement, in adults at least, is not very great, and the splenic features dominate the case throughout, and the ascites and hematemesis, as I have insisted, do not necessarily indicate that the liver is involved.

Can we bring into this category the remarkable group of cases in children, particularly the family form of splenomegaly, which corresponds in so many features with chronic splenic anemia? Take, for example, the case reported by Frederick Taylor.¹ The lad, aged thirteen years, had had for six years an enlarged spleen, with jaundice and enlarged liver. There were anemia, melanoderma, hemorrhages, and clubbed fingers. Postmortem the spleen weighed eighty-seven and a half ounces, and the liver, only forty ounces in weight, was rough and nodular. The case is reported as one of splenomegalic cirrhosis. Bovaird's case, already referred to, was one of two sisters affected. At the age of sixteen years, thirteen years after the onset, there was marked anemia, no jaundice, enormous spleen, moderate enlargement of the liver, and melanoderma. The spleen weighed twelve and a half pounds; the liver, sixty-eight ounces, was cirrhotic. In Rotch's case (No. 18 in Appendix) the lad, aged twelve years, had had a big spleen for nine years. When three years old the spleen and liver were enlarged, and there was anemia. Nine years later the spleen was enormous, reaching to the pelvis; there was pigmentation of the skin and extreme anemia, without leukocytosis. In the cases of Edes (No. 8) and Vickery (No. 12), also of long duration in children with enormous spleens—ascites in the one case and hematemesis in the other—the liver was not enlarged.

Some of these are undoubtedly cases of splenic anemia in child-

¹ Guy's Hospital Reports, vol. liv.

hood. The truth is, we need a very careful study of this group of cases before we can speak of them with any certainty. The cases are singularly chronic, and pass from one physician to another. The relation in time of the hepatic and splenic lesions, the forms of hypertrophic cirrhosis of the liver in children, the relation of the family variety to the others, the state of the liver in the cases of primary splenomegaly, the condition of the blood, the relation of the cases to hemochromatosis and to Hanot's cirrhosis—these are some of the questions awaiting solution. I have purposely refrained from using the terms introduced of late years by our French colleagues, whose studies in cirrhosis of the liver have been so important. The long-sounding names simply express the plain fact that the cirrhosis of the liver may precede (as in portal cirrhosis), accompany (as in hemochromatosis), or follow (as in splenic anemia) the splenomegaly. For the last group the term splenomegalic cirrhosis is allowable; but, as Dr. Frederick Taylor says, it is devoutly to be hoped that “we may be delivered from the cumbrous and unwieldy nomenclature which has been suggested for temporary use by our foreign *confrères*.”

PATHOLOGY. The morbid anatomy throws very little light on the origin of this remarkable disease. Two conditions have been described in the spleen: 1. A fibrosis and hyperplasia, with atrophy of the pulp and a hyaline degeneration of the Malpighian bodies;¹ and with this description Dr. W. G. McCallum tells me our cases (IV., V., and XVI.) correspond, with certain minor differences. 2. On the other hand, a very remarkable change has been found in certain cases of splenomegaly; cases which, as I have said, agree in every clinical particular with the definition of the disease above given. The normal texture is largely replaced by fibrous tissue and large endothelial cells with clear protoplasm containing two or more nuclei, and among them giant cells. The condition is beautifully shown in the illustration in Bovaird's article. No wonder that Gaucher described it as primary endothelioma, although the spleen had been enlarged twenty-five years. The same structure has been described by Picou and Ramond, Collier, Harris and Herzog, and Rolleston. “It has been suggested by Bovaird that the proliferated endothelial cells eventually form fibrous tissue, and, though Harris and Herzog do not support this, the microscopic appearances certainly are compat-

¹ Banti, Ziegler's Beiträge, Band xxiv.

ible with this view. It is perhaps more probable that the fibrous hyperplasia goes on at the same time as the endothelial proliferation, and is due to the same cause, viz.: a chronic intoxication. The fibrous tissue of the organ contains pigment granules of hemosiderin and hematoidin. . . . In some recorded cases fibrosis and atrophy of the pulp and Malpighian bodies have been the only changes described. It is perhaps possible that in such cases the change has progressed, as it may do, in lymphadenoma to fibrosis and disappearance of the endothelial proliferation" (Rolleston). A point to be emphasized in favor of the view that these two changes of endothelial proliferation and fibrous hyperplasia are part of the same process is the identity of the clinical course in cases in which one or other of the changes has predominated. In Bovaird's patient the splenomegaly had lasted thirteen years; there was marked pigmentation, a secondary anemia, and moderate sclerosis of the liver. In Rolleston's case the enlarged spleen had existed twelve years, and, as already stated, in Gaucher's patient twenty-five years.

The true nature of the disease is unknown. It is probably a chronic toxic rather than an infective process, but of the character and the source of the poison we are ignorant. Naturally, with the prevalence of theories of autointoxication, the origin has been sought in the intestinal tract—among the *fermenta imaginaria*, of which Glisson speaks in the section *de Flatu* of his celebrated *Tractatus de Ventriculo et Intestinis*. Harris and Herzog suggest that a chronic hemolysis is caused by an enzyme manufactured by the endothelial cells of the spleen, but this does not explain the cause of the splenic changes. That the spleen is a most important factor in the disease is shown by the cure which has followed its removal, as though the organ were the seat of the manufacture of some poison; but all this is theory.

NOMENCLATURE. "What's in a name?" may well be asked of the disorder under discussion, to which an unusual number of labels have been attached. The all-important matter is to define as accurately as possible the condition named, according to the good rule laid down by Socrates: "Now, I have no objection to your giving names any significance you please if you will only tell me what you mean by them."¹ If our knowledge does not permit to give a name

¹ Plato's *Charmides* (Jowett's Plato, vol. i. p. 21).

according with the etiology of the disease, the rule should be to pick the one which seems least objectionable, taking priority and usage into account. To me splenic anemia seems a less objectionable term than *splenic pseudoleukemia*, *splenic lymphadenoma*, *splenic cachexia*, *primitive splenomegaly*, or *Banti's disease*. So far as we know, the primary involvement is of the spleen, though the anemia and the enlargement of the organ may both depend on a common, unknown factor. The name certainly expresses the two most constant features of the affection, though the anemia is not necessarily present throughout. A serious objection is that the term has been used in a generic sense, as under anemia splenica several diseases have doubtless been described; but the condition here described has features so remarkable and definite that to restrict the term to it seems advisable, with the qualifying addition of the word *chronic*. The protracted course of the disease is one of its most extraordinary peculiarities, and serves to separate this group from the acute anemias with enlargement of the spleen. Usage, too, should count, and it is something that the name should have been introduced by a great clinical physician, Griesinger, and has been adopted by such men as Strümpell, Senator, Coupland, Rolleston and others.

The name *primary* or *primitive splenomegaly* has the advantage of neutrality or indifference in not suggesting any theory of origin, and there is no objection to its use in designating cases—such as those reported by Herrick, Martin, and others—in which the enlarged spleen constitutes the only manifestation. *Banti's disease* is simply chronic splenic anemia plus features of cirrhosis of the liver, which represent a terminal stage in the disease. Banti's merit consists in calling attention to this important aspect; but, after all, these secondary changes in the liver are somewhat rare, and, as my records show, the hemorrhages, ascites, and even the jaundice may be present without existing cirrhosis.

TREATMENT. Since my first paper there has been a notable contribution made to the treatment of splenic anemia in the study, by Harris and Herzog,¹ of the results of splenectomy. Of nineteen cases, in fourteen recovery followed; in one the result was not given. In three of my patients, as already stated, the spleen was removed. In Case IV. (operated on by Dr. Cushing) the man, when heard from

¹ Annals of Surgery, July, 1901.

last, three years after the operation, remained well. This man had had at intervals of a year, for ten years, attacks of hematemesis. In Case V. (operated on by Dr. Cushing), in which the hemorrhages had recurred for more than fourteen years, death occurred on the tenth day from rupture of an esophageal varix. In Case XVI. (operated on by Professor Halsted) the patient died of uncontrollable hemorrhage from the large veins passing between the stomach and the spleen. Recurring hematemesis, the most serious event in the disease, and, as I have insisted, usually of splenic origin, is the most important indication for operation.

CONCLUSION. A growing clinical experience should give a sort of miniature picture of the general clinical experience of the profession. Few of us see all the aspects of any disease; few of us recognize all the aspects of the diseases we see; but all of us can try to correlate our own observations with the facts presented by our colleagues, and this is what I have attempted in these papers on splenic anemia. The conclusion to which I have been led by the study of a remarkable group of cases is that—

From among the conditions with which anemia and enlarged spleen are associated, a well-defined disease may be separated conforming to the definition above given, and which may be called chronic splenic anemia.

APPENDIX.¹

I. *Acute Cases.*

1. Musser (Philadelphia).—Hugh E., aged thirty years; duration fifteen weeks. Diarrhea chief symptom; liver and spleen enlarged. Red blood corpuscles, 890,000; hemoglobin, 20 per cent.; no nucleated red corpuscles; leukocytes average of seven counts, 2400; lowest, 1200 per cubic millimeter.

2. Kelly, A. O. J. (Philadelphia).—W. E. K., female, aged twenty-two years; duration twelve months. Spleen only two fingers' breadth below the costal border. Lowest blood count, 3,070,000 per cubic millimeter; hemoglobin, lowest, 33 per cent.; leukocytes, 6300; nucleated red corpuscles abundant. Death.

3. Wilson, J. C. (Philadelphia).—John V., aged twenty-five years; duration under one year. Spleen three fingers' breadth below the costal border. Red blood corpuscles, 1,650,000 to 4,580,000; hemoglobin, 18 to 65 per cent.; leukocytes, almost always under 4000 per cubic millimeter; no nucleated reds. Yellowish-green tint of skin; marked improvement at date of report.

¹ I am much indebted to my colleagues for the trouble they have taken in sending these reports.

4. Cary (Buffalo).—S., male, aged fifty-nine years; duration eight months. Etiology obscure. Red blood corpuscles, lowest, 1,776,000; hemoglobin, 41 per cent.; leukocytes, 3075; nucleated red corpuscles present. Death. Spleen weighed 1270 grams; liver weighed 2280 grams. No jaundice.

5. Fitz (Boston).—T. B., male, aged twenty-seven years; duration one year. Armenian. Frequent epistaxis; spleen enlarged; liver normal. Red blood corpuscles, 3,652,000 per cubic millimeter; hemoglobin, 65 per cent.; leukocytes, 5800.

6. Fitz (Boston).—T. D., male, aged twenty years; duration one year. Typhoid fever twice; spleen and liver enlarged; jaundice; epistaxis. Red blood corpuscles, 2,500,000; hemoglobin, 40 to 45 per cent.; leukocytes, 20,000.

7. McPhedran (Toronto).—W. W., male, aged thirty-five years; duration several months. Red blood corpuscles, 3,500,000; hemoglobin (?); leukocytes, 7000. Liver slightly enlarged; jaundice well marked; did well on arsenic; relapsed; lost sight of.

8. Edwards, A. R. (Chicago).—Male, aged sixty-five years; duration eleven weeks. Red blood corpuscles, 2,500,000; hemoglobin, 40 per cent.; leukocytes, 5400; nucleated red corpuscles present. Spleen reached half-way to navel; skin lemon tint; repeated (ten or twelve) hemorrhages from the stomach; liver not enlarged; death; no autopsy.

9. Blackader (Montreal).—F. S., male, aged forty-two years; duration six weeks before admission. Malaria fifteen years previously; spleen reached to navel. Red blood corpuscles, 1,106,000; eight days later, 843,336; leukocytes scanty. Liver enlarged; temperature, 100° to 103° F.; diarrhea.

10. Martin, C. F. (Montreal).—Male, aged thirty-nine years; duration of illness five months. After complaining for a time of shortness of breath he had slight hematemesis, and once a large dark (probably bloody) stool. On admission, November 15, 1900, profound anemia; spleen much enlarged, reaching nearly to the navel. Red blood corpuscles, 2,060,000; hemoglobin, 25 per cent.; leukocytes, 2000. Died end of December.

11. Sears (Boston).—A. I., female, aged forty-nine years; duration six months (?). Malaria fifteen years ago; liver enlarged; ascites present. Red blood corpuscles, 3,008,000 to 4,240,000; hemoglobin, 30 to 35 per cent.; leukocytes, 2600 to 3800.

12. Rotch (Boston).—James P., aged four months; duration of illness two months. Spleen reached to middle line and nearly to crest of the ilium; liver 3 cubic millimeters below the costal border. Red blood corpuscles, 2,408,000; hemoglobin, 25 to 30 per cent.; leukocytes, 2800; no nucleated red corpuscles.

II. *Chronic Cases.*

1. Musser (Philadelphia).—J. P., aged twenty-eight years; duration seven years. Spleen very large; liver $\frac{1}{2}$ cubic millimeter below costal margin; diabetes chronic; hemoptysis; epistaxis. Red blood corpuscles, 1,990,000; hemoglobin, lowest, 30 per cent.; leukocytes, 2040 to 6400 per cubic millimeter;

nucleated red corpuscles. Death, acute pneumonia; light yellow tint of skin through the illness. Case reported as Banti's disease by H. A. Hare; case also under J. C. Wilson. Postmortem: hyperplasia in liver; pancreatic sclerosis.

2. Kelly, A. O. J. (Philadelphia).—J. M., male, aged thirty-six years; duration three years. Spleen a hand's breadth below the costal border; liver slightly enlarged; hematemesis a marked feature of the case. Red blood corpuscles, lowest, 2,110,000; hemoglobin, 47 per cent.; leukocytes, 4200. Still under observation.

3. Fitz (Boston).—K. T., male, Armenian, aged twenty-two years; duration of illness three years. Malaria (?); spleen enlarged; liver normal. Red blood corpuscles, 3,920,000; hemoglobin, 55 per cent.; leukocytes, 2900.

4. Fitz (Boston).—Annie H., Armenian, aged thirty years; duration of illness five years. Malaria (?). Red blood corpuscles, 3,693,000; hemoglobin, 53 per cent.; leukocytes, 7800. Liver and spleen enlarged.

5. McPhedran (Toronto).—Female, aged thirty-one years; duration two years. Red blood corpuscles, 4,000,000; hemoglobin, 73 per cent.; leukocytes, 6500. Spleen much enlarged; liver slightly enlarged; moderate jaundice; laparotomy; slight ascites; improvement; death two months later from diphtheria. Diagnosed as Banti's disease.

6. Hun (Albany).—Female, aged thirty years; duration eleven years. Always pale; many attacks of jaundice. Red blood corpuscles, 2,152,000; hemoglobin, 38 per cent.; leukocytes, 14,000. Moderate enlargement of liver. In 1899, pleurisy, with effusion; tubercle bacilli in sputum; spleen enormously enlarged.

7. Cutler (Boston).—Male, aged sixty-five years; good habits; duration six years. Began with vomiting large amount of blood; fainted. Three years later, second attack; four years later, third attack; in July, 1901, fourth attack; in October, fifth attack; in each only a single attack. No nausea or dyspepsia in intervals. Gained weight and strength rapidly. Liver not enlarged; no jaundice; spleen enlarged 8 cubic millimeters below the costal border. At time of observation, March 7, 1902, six months after last attack, still pale, but general condition good. Red blood corpuscles, 5,216,000; hemoglobin, 60 per cent.; leukocytes, 6200. Spleen much enlarged.

8. Edes (Boston).—P. H., male, aged nine years; severe; duration four years. In July, 1900, enlarged spleen and ascites. Red blood corpuscles, 3,769,000; leukocytes, 5700. Laparotomy. Ascites returned and then disappeared; copious hematemesis once; no jaundice; liver not enlarged. April, 1902, boy has remained pale; spleen at level of navel. Severe typhoid fever four years before onset of ascites and enlargement of spleen.

9. Peabody (New York).—Camillo E., aged thirty-six years; duration six years. Chills in Italy three months ago; sore on penis two months ago; hematemesis six years ago; six attacks in all—very severe; spleen greatly enlarged. Red blood corpuscles from 1,820,000, on December 24th, to 3,856,000, on February 16th; hemoglobin, 27 to 56 per cent.; leukocytes, 800 to 1400; no nucleated red corpuscles. Liver dulness diminished; no ascites.

10. Herrick (Chicago).—T. S., male, aged twenty-five years; duration more than two years. Typhoid fever three years ago. February 3, 1900, hematemesis, severe; fainted; three subsequent attacks—last severe, in February, 1902. Has grown paler, and has a subicteroid tint. Liver not enlarged; spleen much enlarged, reaching below navel April, 1902. Red blood corpuscles, 2,950,000; hemoglobin, 35 per cent.; leukocytes, 2600; no nucleated red corpuscles.

11. Dock (Ann Arbor).—Male, aged forty-one years; duration sixteen months. No hemorrhages; no jaundice; liver slightly enlarged. Red blood corpuscles, 4,480,000; hemoglobin, 75 per cent.; leukocytes, 5857; a few nucleated red corpuscles.

12. Vickery (Boston).—Fanny S., aged seven years; duration of illness eight years. In 1894 profuse hemorrhage from the stomach; liver not enlarged; spleen much enlarged. Red blood corpuscles, 2,560,000; hemoglobin, 20 per cent.; leukocytes, 650 to 700; no nucleated red corpuscles. In 1899 intense hemorrhage from the stomach; death.

13. Stockton (Buffalo).—W. B., male, aged fifty-two years; duration more than two years. Spleen reached to the navel; liver enlarged; no hemorrhages. Red blood corpuscles, 4,650,000; hemoglobin, 68 per cent.; leukocytes, 13,000. (Case of Dr. Woehnert's.)

14. Stockton (Buffalo).—M. S., male, aged fifty years; duration one year. Spleen very large; liver enlarged. Red blood corpuscles, 2,685,000; hemoglobin, 45 per cent.; leukocytes, 4000. No jaundice or ascites; marked pigmentation of the skin.

15. Stockton (Buffalo).—Male, aged sixty years; duration eighteen months. Spleen greatly enlarged; liver enlarged; marked sallow pigmentation. Red blood corpuscles, 2,900,000; hemoglobin, 55 per cent.; leukocytes, 3900.

16. Atkinson, A. D. (Baltimore).—Male (colored), aged forty-eight years; duration seven years +. No malaria. In 1892, attack of jaundice, with swelling of the abdomen; in 1894, melena; in 1897, a second attack. Enlarged spleen discovered in 1898; ascites. Red blood corpuscles, 4,000,000; hemoglobin, 54 per cent.; leukocytes, 1500. In August, 1899, vomited large amount of blood; liver not enlarged. Autopsy: spleen weighed 2400 grams—chronic hyperplasia; Malpighian bodies not made out; liver was not enlarged and showed no well-defined increase in the connective tissue.

17. Sears, D. (Boston).—Frank D., aged twenty-seven years; duration seven years. Doubtful history of malaria; no hemorrhages; liver enlarged; no jaundice; ascites present. Red blood corpuscles, 1,808,000 to 2,240,000; hemoglobin, 25 to 30 per cent.; leukocytes, 1850 to 3400; myelocytes, 3.5 per cent.

18. Rotch (Boston).—A. S., male, aged twelve years; duration nine years. When conditions had lasted three years: red blood corpuscles, 2,412,000; hemoglobin, 18 per cent.; leukocytes, 36,000; no nucleated red corpuscles. Liver enlarged; spleen extended below the navel. After condition had lasted nine years: red blood corpuscles, 1,733,000; hemoglobin, 30 per cent.; leukocytes, 6000. Liver still enlarged; skin and conjunctivæ stained, but no bile in urine; spleen extended into the pelvis.

19. Stewart, D. D. (Philadelphia).—Mrs. A., aged thirty years; duration doubtful, probably some years. Has had peculiar yellow hue since childhood. Spleen greatly enlarged; no enlargement of liver; no jaundice. Red blood corpuscles, 2,684,000; hemoglobin, 58 per cent.; leukocytes, 6700. Has had epistaxis.

20. Cabot, R. C. (Boston).—N., female, aged thirteen years; duration (?). Ascites; hematemesis, caused death; melena; liver not enlarged. Red blood corpuscles, 4,280,000; hemoglobin, 42 per cent.; leukocytes, 1300 to 2100.

21. Cabot, R. C. (Boston).—D., female, aged twenty-three years; duration ten years. Liver not enlarged; hematemesis at intervals for ten years; died of hemorrhage. Red blood corpuscles, 1,656,000 to 4,240,000; hemoglobin, 18 to 60 per cent.; leukocytes, 1300 to 2300.

22. Cabot, R. C. (Boston).—A., male, aged twenty-four years; duration (?). Jaundice; liver enlarged; no hemorrhages. Red blood corpuscles, 4,620,000; hemoglobin, 48 per cent.; leukocytes, 6400.

23. Cabot, R. C. (Boston).—N., male, aged thirty-two years; duration (?). Red blood corpuscles, 4,684,000; hemoglobin, 55 per cent.; leukocytes, 9000; 18 normoblasts per cubic millimeter.

24. Cabot, R. C. (Boston).—W., female, aged fifty-three years; duration (?). Red blood corpuscles, 4,790,000; hemoglobin, 65 per cent.; leukocytes, 4800.

25. Cabot, R. C. (Boston).—I. H., male, aged thirty-five years; Armenian; duration (?). Red blood corpuscles, 3,484,000; hemoglobin, 45 per cent.; leukocytes, 4500.

26. Cabot, R. C. (Boston).—T., male, aged twenty-seven years; duration unknown. Red blood corpuscles, 3,652,000; hemoglobin, 65 per cent.; leukocytes, 5800.

III. *Simple Splenomegaly.*

Herrick (Chicago).—Felix G., aged twenty-five years; duration many months, probably two to five years. Spleen greatly enlarged; liver normal. Red blood corpuscles, 5,120,000; hemoglobin, 80 per cent.; leukocytes, 5000. Has not been well for five years.

Blackader and C. F. Martin (Montreal).—Male, aged twenty-one years. At eighteen had an attack of jaundice; nothing abnormal in abdomen. In January, 1901, by an accident, in which he was struck in the abdomen, he was knocked breathless; on recovery vomited a dark material. Afterward the spleen was found to be enlarged, and it has gradually increased in size to date, and now crosses the middle line. Red blood corpuscles, 4,710,000; hemoglobin, 90 per cent.; leukocytes, 5000.

IV. *Other Diseases.*

Cary (Buffalo).—V. B., aged forty years. Hemorrhages, melena, and epistaxis. Red blood corpuscles, 4,600,000; hemoglobin, 6 per cent.; leukocytes, 3120. Spleen enlarged. Doubtful, during life, of splenic anemia. Postmortem: cirrhosis of liver. Spleen weighed 730 grams; liver, 1860 grams.

Ewing (New York).—F., aged thirty-two years; duration four years. Spleen very large, 1470 grams. Red blood corpuscles, 2,908,000; hemoglobin, 45 per cent.; leukocytes, 3300. Liver enlarged; ascites. Postmortem: large round-celled sarcoma of spleen (epithélome primitive); gummata of spleen; diffuse cirrhosis of liver. (Case to be published by Dr. C. W. Field.)

In Cary's case the picture during life suggested splenic anemia, but the postmortem showed alcoholic cirrhosis, with enlarged spleen. In Ewing's case there was round-celled sarcoma of the spleen, with gummata, and also diffuse cirrhosis of the liver. It is interesting to note the similarity of the blood condition to that in cirrhotic splenic anemia. It is quite possible that when the full report is published this case will prove to be similar to those of Bovaird and others.

V. *Cases Difficult to Classify.*

I. Musser.—J. H., aged forty-five years; duration four years. Syphilis. In latter part of 1898 and 1899 jaundice, with enlargement of spleen and liver; hemorrhages of stomach and bowel. Lowest blood count, 3,200,000 per cubic millimeter; hemoglobin, lowest, 65 per cent.; no leukocytosis. He had cerebral syphilis.

II. Greene.—Mrs. L. H., aged twenty-one years; duration four years—followed typhoid fever. Spleen five inches below the costal margin; liver not enlarged; tuberculous history; has had cough and expectoration; flatness at both apices. Red blood corpuscles, 2,500,000; hemoglobin, 45 per cent.; leukocytes, 10,000.

III. Sears.—J. W., female, aged forty-six years; duration twelve years (?). Biliary colic for twelve years; no malaria; no syphilis; liver much enlarged; spleen extends to ilium; no hemorrhages; jaundice present; no ascites. Red blood corpuscles, 3,496,000 to 4,308,000; hemoglobin, 60 per cent.; leukocytes, 1400 to 5800.

In I. the possibility of syphilis of the liver has to be considered; in II. the complication of tuberculosis makes one doubtful; while in III. the long duration of attacks of colic make it possible that the whole trouble is pressure on the liver, though it is rare to see, in cirrhosis from any cause, a spleen that reaches to the ilium.



